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VEGETATION AND FLORA OF BOLD PARK, PERTH

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ABSTRACT

An account is given of the vegetation and floristics of Bold Park, an urban bushland remnant. Despite extensive past and continuing disturbance, the flora is rich in species (356 recorded) and vegetation structure (seven formations and 20 associations). Several species are at the ends of their known range, and one is known from only two other reserves.

INTRODUCTION

Bold Park is a large remnant of near coastal bushland, located within the metropolitan suburbs of City Beach (Perth) and Nedlands. The area considered in this paper is bounded by Oceanic Drive, Perry Lakes, Stephenson Avenue and West Coast Highway.

Application to subdivide a portion of this bushland for residential development (Kinhill 1987; Anon 1988), prompted a baseline survey of the flora of this proposed reserve (recommendation M47 of the Conservation Through Reserves Committee report), which apart from a brief list by the Tree Society (119 species recorded) has not previously been studied.

Physiographically the region consists of sandy undulating Quindalup Association dunes, Cottesloe Association limestone and a low lying swale area. Soils are mainly sands of marine origin blown over limestone with a low lying swale areas on the leeward side of the dunes around Perry Lake Drive.

The vegetation present here was once part of the widespread Cottesloe, Quindalup and Karrakatta complexes of the Swan Coastal Plain (Seddon 1972), much of which has been lost to urban and agricultural development.

MATERIALS AND METHODS

The survey was undertaken by foot traverse during all major flowering periods in 1987/88. Vegetation was classified into structural types (woodland, heath etc) based on dominant species using aerial photography and checked by inspection on foot.

Inspection revealed considerable floristic variation within these vegetation types, and a series of 20 permanent 100 m² quadrats were set up to define the floristic composition, and weed invasion of each type.

Nomenclature of species follows Green (1988). Voucher collections of the flora are deposited in the W.A. Herbarium (PERTH).

RESULTS

Vegetation

Formations

Five major vegetation formations can be recognized. Two other habitats (disturbed areas and the pine plantation) form distinct habitats and are mapped here (see Figure 1).

Banksia woodlands (including *Banksia prionotes* and *Eucalyptus decipiens* stands).

ii) Eucalypt woodlands (Jarrah-Marri, Tuart and Flooded Gum).

iii) Shrublands (*Acacia rostellifera* and *Acacia xanthina*).

iv) Heath (limestone heath, dune heath, *Dryandra sessilis* and *E. foecunda mallee*).

v) Wetland communities (sedgeland and woodland).

vi) Disturbed sites (roads, tracks, lawn, oval).

vii) Pine plantation.

The common vegetation formations are Banksia low woodland, Tuart woodland and heath (Figure 1).

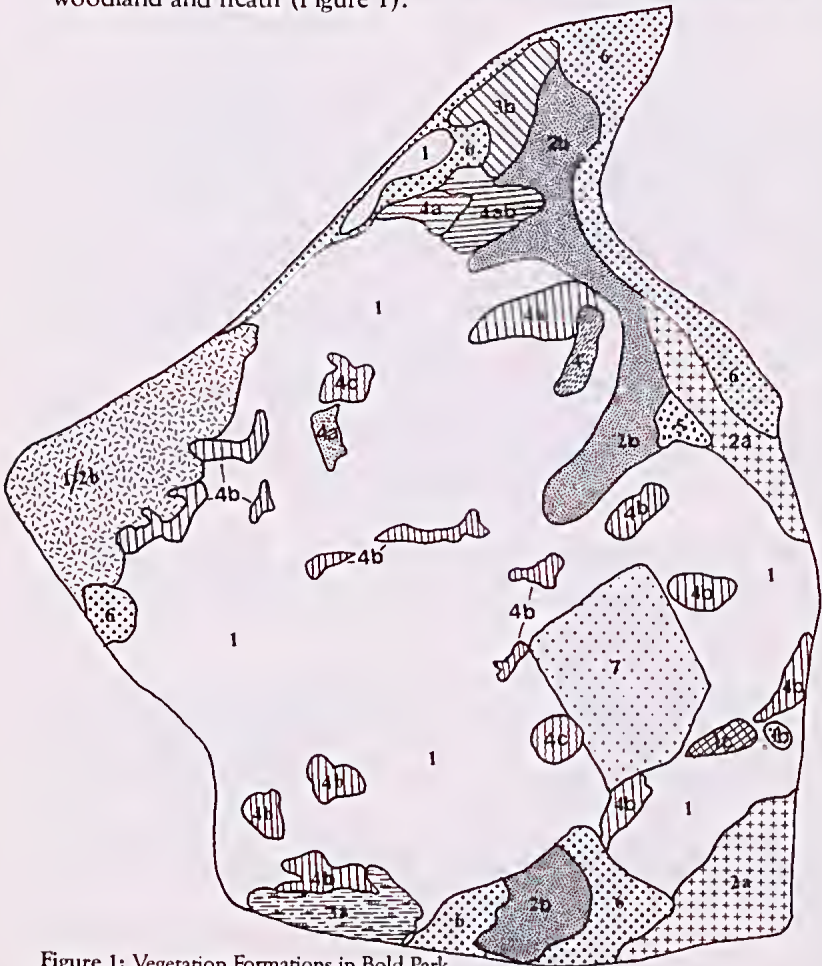


Figure 1: Vegetation Formations in Bold Park.


Key I: Banksia 


1B: *Banksia prionotes* occurrence 


1C: *Eucalyptus decipiens* stand 


2A: *Eucalyptus calophylla/marginata* woodland 


2A: *Eucalyptus gomphocephala* woodland 

3A: *Acacia rostellifera* shrubland 

3B: *Acacia xanthina* shrubland 


4A: Limestone heath 

4B: Dune heath 

4C: *Dryandra sessilis* heath 

4D: *Eucalyptus foecunda* stand 

5: Swamp 

6: Disturbed 

7: Pines 

Within these structural vegetation types considerable variation in composition occurs, and 20 permanent 100 m² quadrats were used to document this variation.

Floristics:

The quadrats are discussed on a rough west to east axis.

(a) *Acacia rostellifera* shrubland

This shrubland occurs on the south-western margins of Bold Park, and is apparently a fire climax community. The upper slopes have a low closed shrubland (type A) and the valleys a low open woodland (type B). These stands had only 50% of species in common at the sites sampled, differing mainly in the shrub strata, which had only *Melaleuca acerosa* in common. The herbaceous community is largely composed of introduced herbs, which differ in composition (*Fumaria* spp. vis. *Ehrharta longiflora*), perhaps due to the differing fire histories of the stands.

(b) *Agonis flexuosa* low woodland

A rare community (too small to map separately) found only at the base of deep valleys. Again, introduced herbs dominate the lowest stratum.

(c) Dune Heath

The most variable vegetation formation, depending on slope, aspect, soil type and soil depth. The heath is either dominated by *Olearia axillaris* (Appendix 1, 3A), *Allocasuarina humilis* (Appendix 1, 3B), *Dryandra sessilis* (Appendix 1, 3C) or *Chamelaucium uncinatum* (Appendix 1, 3D), with a species-rich understorey containing few weeds, none of which dominate the stratum they occur in.

(d) Disturbed areas

This is a heterogeneous complex of roadverges, ovals, quarries and mowed lawns under trees. During winter and spring the mowed areas support a varied herb flora, especially *Cotula turbinata*, which provides

a major food resource for Twenty-eight parrots. Counts of over 30 Twenty-eight parrots feeding on these lawns along Perry Lakes Drive are usual during this period.

(e) Pine plantation

The quadrat (Appendix 1, 5) illustrates the almost total clearing (during the depression) that preceding planting of the plantation, leaving mainly herbaceous perennials and weeds as the understorey. However, 47 species of native shrub still persist under the pines, enabling some utilization of the region by native fauna. Black cockatoos use the pine seeds to supplement *Dryandra sessilis* seeds.

(f) *Banksia* low woodland

The common vegetation formation of Bold Park, often with scattered *Eucalyptus gomphocephala* trees emergent on the valley slopes.

As documented in the quadrats (Appendix 1, 6A, Band C), *Banksia menziesii* (Appendix 1.6B) predominates on the western dunes, *Banksia attenuata* on the central and eastern. Near the pine plantation stands of *Eucalyptus decipiens* occur (Appendix 1.6C). The woodland is species-rich, but again the herbaceous layer is mainly introduced annuals. The major weeds being *Ehrharta calycina* and *Pelargonium capitatum*. The quadrats show considerable floristic difference, especially in the herbaceous layers. Each site differed from each other in about 50% of the species composing the understorey.

A third *Banksia*, the acorn banksia (*Banksia prionotes*) occurs in two stands. One on the eastern edge of the pine plantation, the other in mixed *Banksia* woodland near Wollaston college. Neither of these stands were large enough for quadrat placement.

(g) Tuart woodland

Pure stands only occur in the deep interdunal valleys. The ground flora is now almost totally composed of introduced species (Appendix 1, 7).

(h) Jarrah woodland

This woodland occurs only on the southern and eastern margins of Bold Park. Jarrah forms a pure stand near Wollaston College (Appendix 1, 8A), whereas around Camel Lake, Marri predominates (Appendix 1, 8B). Again *Ehrharta calycina* is the main invasive species, although lupins (*Lupinus anugustifolius*) and clovers (*Trifolium* spp) are also present.

(i) *Acacia xanthina* shrubland

An unusual vegetation formation that is species-rich, especially in low shrubs (Appendix 1, 9). Although numerous alien herbs are present no individual species assumes major significance as in *Acacia rostellifera* shrubland.

(j) Swamp

This, the only member of the Perry Lake wetlands still largely in a natural state and surrounded by woodlands with a shrub understorey, not lawn. The area is relatively species-poor (Appendix 10A, B and C) but contains numerous species that are only recorded for Bold Park in this region.

Several extremely serious invasive grasses have been introduced into the area, namely Buffalo (*Stenotaphrum secundatum*) and Kikyu

(*Pennisetum clandestinum*) (Appendix 1, 10, B). These grasses smother most ground covers and should be contained or eliminated.

The lake is used as a major bathing site (and drinking site) for Bold Park birds, unlike the more artificial Perry Lakes).

(k) Limestone heath

Either dominated by *Acacia truncata* (Appendix 1, A and B) or *eucalyptus foecunda*, this heath is not as species-rich as dune heath *Acacia xanthina* shrubland or *Banksia* woodlands, but it contains a number of uncommon species confined to the swan coastal plain (*Stylidium* aff. *affine* and *Eucalyptus foecunda*).

The vegetation of Bold Park is extremely variable and complex in composition despite only falling into 7 major formations as these can be further sub-divided into 20 distinct associations based on floristics.

Many of the understorey species are widespread, except for those of the swamp community which tend to be restricted to this community. A progression of commonality can be found from limestone communities (heath, *Acacia xanthinas* shrubland), through Jarrah woodland to the sandy soils of *Banksia* woodlands and heaths, most understorey species being common to both types.

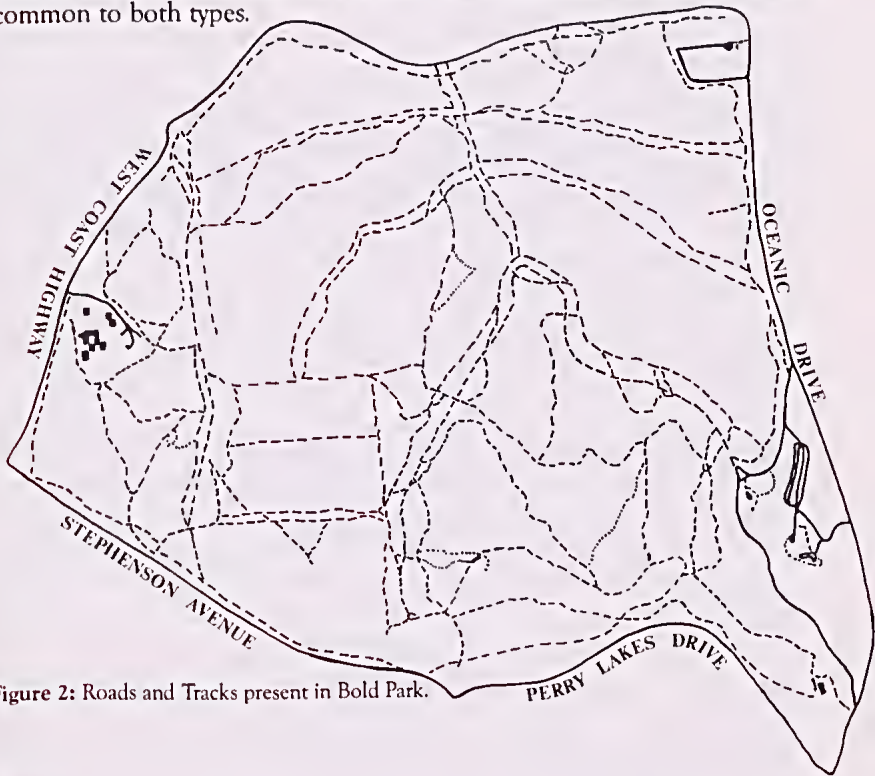


Figure 2: Roads and Tracks present in Bold Park.

Flora

To date, a total of 356 species of flowering plant (Appendix 2) have been found growing naturally in Bold Park. Another 44 species, not included in the flora list, have been planted in bushland areas (Appendix 3). Of this total, 226 were native to Western Australia, and are 130 aliens (mostly of Mediterranean or South African origin). The large number of aliens can be related to the long history of disturbance occurring in Bold Park (grazing,

fires, roads, horses, lawns, quarries, tracks and plantings). An idea of the level of continuing disturbance can be seen in Figure 2, which shows the over abundance of tracks present in the area, all of which aid penetration of the bushland by weeds. To avoid further spread and additional colonization by aliens there must be a major reduction in the number of access tracks, and in the level of general disturbances such as "enrichment plantings" and track "maintenance".

The number of plant species recorded for Bold Park (321 hectares) compares very favourably with any other area of bushland on the Northern Swan Coastal Plain -

- (a) Yalgorup National Park (Fox *et al.* 1980). 11 545 ha: 295 native, 55 introduced. (However, this area must be presumed as undersampled, as one could expect at least double this figure.)
- (b) Kings Park (Bennett, pers. comm.) 400 ha: 275 native, 143 introduced.
- (c) Starr Swamp (Loneragan *et al.* 1984) 100 ha: 166 native, 55 introduced.
- (d) Yanchep National Park (Keighery and Alford, pers. comm.) 2 799 ha: 405 native, 105 introduced.

Rare or unusual flora

The southernmost recorded stands of *Gyrostemon ramulosus* and *Chamelaucium uncinatum* (Geraldton Wax) occur in Bold Park. The stands of *Chamelaucium* are the closest to the type locality (Arthur Head; Fremantle), and their preservation is of considerable importance for this horticulturally significant species. The natural gene pool of this is being threatened by plantings of this species from outside the area (at least 3 forms are involved). To protect this historically important stand these plantings should be removed.

The stand of *Agonis flexuosa* is probably the northernmost known, although escapes from cultivation occur north of here (e.g. Yanchep National Park).

The *Stylidium* aff. *affine*, is a species confined to the Swan Coastal Plain, only known from Yanchep and Yalgorup National Parks apart from Bold Park. This is an important population for this restricted species.

The populations of *Sonchus* aff. *asper* at Camel Lake are unique. These plants are rosetted perennial herbs, not erect succulent annuals. They may be a native *Sonchus* species and this currently is the only known population.

DISCUSSION

Bold Park is a significant bushland remnant in the urban area of Perth. It is both large in area (over 300 ha) and geographically placed to be an important staging ground for native birds moving through the metropolitan region.

The area complements Kings Park and the two major national parks to the north (Yanchep) and south (Yalgorup) in its vegetation and floristics. Kings Park does not possess any freshwater wetlands, limestone heath or *Acacia* shrublands, rather it contains species typical of coastal plain woodlands. Yanchep does not contain any *Acacia* shrublands or near coastal dune heath, whereas Yalgorup lacks *Acacia xanthina* shrubland and freshwater swamps.

Despite significant weed invasion, mainly by herbs, the vegetation structure remains intact (Appendix 1), but like Kings Park (where the level of weed invasion is severe) management should be able to lessen the problem. Past disturbance and continuing poor management practices ("enrichment plantings"), too many tracks and lack of a co-ordinated planning) will lead to further deterioration.

Detailed studies being undertaken at Kings Park (Mattiske *et al.* pers. comm.) and Yanchep (Keighery and Alford), when published, will complement this survey and enable an objective comparison of their conservation values on a floristic basis. There is a great need for floristic studies of other urban bushland remnants to detail their conservation values.

A public management plan should be prepared by the Perth City Council to protect this section of Perth's natural heritage.

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APPENDIX 1

Vegetation Site Descriptions (East-West)

Introduced species indicated by asterix

(1) *Acacia rostellifera* shrubland

Contains two distinct stands, probably differing in age since the last fire.

Type A: Low Closed Shrubland

Stratum 1: Shrubs 2 — 4 m. *Acacia rostellifera*

Stratum 2: Shrubs 50 cm — 1.5 m. *Acacia lasiocarpa*, *Melaleuca acerosa*, *Templetonia retusa*, *Helichrysum cordatum*, *Cassytha flava*

Stratum 3: Shrubs 20 — 50 cm. **Pelargonium capitatum*, *Scaevola canescens*, *Tersonia cyathiflora*, *Opercularia vaginata*

Stratum 4: Herbaceous perennials. *Acanthocarpus preissii*, *Lomandra maritima*, *Dianella revoluta*, *Loxocarya cinerea*, *Caladenia latifolia*, *Stipa flavescens*

Stratum 5: Herbs. **Fumaria muralis*, **Fumaria capreolata*, *Calandrinia brevipedata*, **Anagallis arvensis*, **Sonchus oleraceus*, **Lagurus ovatus*, **Petrohagia velutina*

Number of species: 23, 6 aliens.

Type B Low Open Woodland: Here the Acacia shrubland forms a low open woodland, to 5-6 metres tall, with scattered trees of *Agonis flexuosa*.

Stratum 1: Shrubs 5 — 6 m. *Acacia rostellifera* (many dead), *Agonis flexuosa*

Stratum 2: Shrubs 2 — 3 m. *Myoporum insulare*, *Spyridium globulosum*, *Olearia axillaris*, *Melaleuca acerosa*, *Rhagodia baccata*, *Hardenbergia comptoniana* (vine), *Clematis aristata* (vine)

Stratum 4: Herbaceous perennials/Sedges. *Loxocarya cinerea*, *Lomandra maritima*, *Caladenia latifolia*, *Acanthocarpus preissii*, *Dianella revoluta*, *Poa* sp. **Oxalis pres-caprae*

Stratum 5: Herbs. **Ehrharta longifolia* (>50% cover), **Fumaria capreolata* (20% cover), **Sonchus oleraceus*, **Euphorbia pepus*, **Fumaria muralis*

Number of species: 21, 6 aliens.

(2) *Agonis flexuosa* low woodland

Stratum 1: Mallee *Agonis* to 6 m. *Agonis flexuosa*

Stratum 2: Shrubs to 4 m. *Hakea prostrata*, *Allocasuarina humilis*

Stratum 3: Shrubs to 2 m. *Acacia pulchella*, *Hardenbergia comptoniana* (vine)

Stratum 4: Shrubs less than 1 m. *Helichrysum cordatum*, *Jacksonia sericea*, *Melaleuca acerosa*, *Olearia axillaris*, *Gompholobium aristatum*, *Leucopogon australis*, *Lechenaultia linearoides*

Stratum 5: Herbaceous perennials. **Pelargonium capitatum*, *Opercularia vaginata*, **Gladiolus caryophyllaceus*

Stratum 6: Sedges. *Tetraria octandra*, *Loxocarya cinerea*, **Ehrharta calycina*, *Conostylis candicans*, *Lomandra maritima*

Stratum 7: Herbs **Trifolium campestre*, **Lagurus ovatus*, **Briza maxima*, **Petrohagia velutina*, **Avena barbata*

Number of species: 25, 8 aliens.

(3) Dune Heath (heath on deep sand)

A very variable vegetation complex, scattered throughout the region.

(A) *Olearia axillaris* dominated

Stratum 1: Shrubs 1.5 — 3.0 m. *Olearia axillaris* (90% of this stratum), *Chamelaucium uncinatum*, *Dryandra sessilis*

Stratum 2: Shrubs 0.6 — 1.0 m. *Templetonia retusa*, *Helichrysum cordatum*, *Calothamnus quadrifidus*, *Leucopogon australis*

Stratum 3: Shrubs 30 cm — 50 cm. *Acacia lasiocarpa* (60% of this stratum), *Melaleuca acerosa*, *Cassitya flava*, *Hibbertia racemosa*, *Diplopeltis huegelii*, *Lechenaultia linearoides*, *Scaevola canescens*, *Hemiandra pungens*, *Hardenbergia comptoniana* (vine)

Stratum 4: Herbaceous perennials. *Conostylis aculeata*, *Dianella revoluta*, *Acanthocarpus preissii*, *Loxocarya cinerea*, *Lepidosperma angustatum*, *Tetraria octandra*, *Thysanotus arenarius*, **Pelargonium capitatum*

Stratum 5: Herbs. *Trachymene pilosa*, *Calandrinia brevipedata*, **Lagurus ovatus*, **Dischisma arenarium*, *Calandrinia corrigioloides*, *Triglochin calcitrapa*, **Heliophila pusilla*, **Sonchus oleraceus*, *Daucus glochidiatus*

Number of species: 33, 5 aliens.

(B) Western dune heath (yellow sand over limestone)

Stratum 1: Shrubs 2-3 m. *Hakea prostrata*

Stratum 2: Shrubs 1 — 1.5 m. *Allocasuarina humilis* (20% of total cover), *Calothamnus quadrifidus*, *Acacia cochlearis*, *Helichrysum cordatum*

Stratum 3: Shrubs 50 cm — 90 cm. *Melaleuca acerosa*, *Gompholobium aristatum*, *Acacia pulchella*, *Grevillea crithmifolia*, *Conostephium preissii*, *Opercularia vaginata*, *Leucopogon* sp., *Jacksonia sericea*, *Lechenaultia linearoides*

Stratum 4: Herbaceous perennials. *Mesomelaena stygia* (20% of total cover), *Tetraria octandra*, *Tricoryne elatior*, *Conostylis candicans*, *Sowerbaea laxiflora*, *Xanthosia huegelii*, *Stylidium macrocarpum*, *Scaevola holosericea*, *Loxocarya cinerea*, *Caladenia latifolia*, *Lomandra maritima*, *Hovea trisperma*, *Anigozanthos manglesii*, *Drosera macrantha*, **Gladiolus caryophyllaceus*, **Pelargonium capitatum*

Stratum 5: Herbs. *Crassula colorata*, **Cerastium glomeratum*, **Ursinia anthemoides*, **Anagallis arvensis*, **Lagurus ovatus*, *Homalosciadium homalocarpum*, **Heliophila pusilla*, **Petrohagia velutina*, **Briza maxima*

Number of species: 39, 9 aliens.

(C) *Dryandra sessilis* dominated heath

Stratum 1: Shrubs 2 — 3 m. *Dryandra sessilis*

Stratum 2: Shrubs 1 — 2 m. *Melaleuca acerosa*, *Olearia axillaris*

Stratum 3: Shrubs 40 cm — 90 cm. *Grevillea crithmifolia*, *Jacksonia sericea*, *Lechenaultia linearoides*, *Acacia lasiocarpa*, *Diplopeltis huegelii*, *Gompholobium aristatum*, *Acanthocarpus preissii*, *Hemianandra pungens*, *Hibbertia racemosa*, *Helichrysum cordatum*, *Scaevola canescens*, *Hardenbergia comptoniana* (vine)

Stratum 4: Herbaceous perennials. *Stipa flavescens*, *Loxocarya cinerea*, *Conostylis aculeata*, *Lepidosperma leptostachyum*, *Cassytha racemosa*, *Thysanotus arenarius*, **Pelargonium capitatum*, *Lomandra maritima*, *Tetraria octandra*, **Ehrharta calycina*

Stratum 5: Herbs. *Calandrinia corrigioloides*, *Calandrinia liniflora*, *Triglochin calcitrapa*, **Heliophila pusilla*, **Petrohagia velutina*, **Sonchus oleraceus*, *Trachymene pilosa*, *Crassula colorata*, *Waitzia suaveolens*, **Ursinia anthemoides*

Number of species: 35, 6 aliens.

(D) *Chamelaucium* dominated, western grey sand dune

Stratum 1: Shrub 2 — 3 m. *Chamelaucium uncinatum*

Stratum 2: Shrubs 1 — 1.8 m. *Calothamnus quadrifidus*, *Olearia axillaris*, *Helichrysum cordatum*, *Acacia cochlearis*, *Olx benthamiana*

Stratum 3: Shrubs 30 cm — 80 cm. *Diplopeltis huegelii*, *Acacia lasiocarpa*, *Tersoonia cyathiflora*, *Hibbertia racemosa*, *Opercularia vaginata*, *Scaevola canescens*, *Hardenbergia comptoniana* (vine), *Clematis microphylla* (vine)

Stratum 4: Herbaceous perennials. *Conostylis candicans*, *Acanthocarpus preissii*, *Loxocarya cinerea*, *Tricoryne elatior*, *Lomandra maritima*, *Stipa flavescens*, *Thysanotus patersonii*, **Pelargonium capitatum*, **Ehrharta calycina*

Stratum 5: Herbs. **Dischisma arenaria*, **Petrohagia velutina*, **Ursinia anthemoides*, **Lagurus ovatus*, **Hypochaeris glabra*, **Sonchus oleraceus*, *Calandrinia brevipedata*, *Senecio laetus*

Number of species: 31, 8 aliens.

(4) Disturbed — Cleared Sites

No quadrats surveyed.

(5) Pine Plantation

Stratum 1: Trees 10 — 15 m. *Pinus pinaster*

Stratum 2: Herbaceous perennials — Sedges. **Ehrharta calycina*, *Lepidosperma angustatum*, **Pelargonium capitatum*, *Conostylis aculeata*, *Acanthocarpus preissii*, *Kennedia prostrata*

Stratum 3: Herbs. **Briza maxima*

Number of species: 8, 4 aliens.

(6) Banksia Low Woodland

The common vegetation formation of Bold Park often has the occasional emergent Tuart tree and less commonly Jarrah. Merges into heath or Tuart Woodland. Three major variations are found:

(A) "Normal" woodland

Stratum 1: Low trees 5 — 8 m. *Banksia attenuata*, *Banksia menziesii*

Stratum 2: Shrubs 1 — 2 m. *Calothamnus quadrifidus*, *Allocasuarina humilis*, *Leucopogon australis*, *Acacia cyclops*, *Grevillea crithmifolia*, [*Cassytha flava*, *Hardenbergia comptoniana* (vines)]

Stratum 3: Shrubs 30 cm — 80 cm. *Acacia pulchella*, *Scaevola canescens*, *Lechenaultia linearoides*, *Melaleuca acerosa*, *Tersonia cyathiflora*

Stratum 4: Herbaceous perennials. **Pelargonium capitatum*, *Tetraria octandra*, **Ehrharta calycina*, *Lomandra maritima*, **Gladiolus caryophyllaceus*, *Loxocarya cinerea*, *Conostylis aculeata*

Stratum 5: Herbs. *Crassula colorata*, *Isolepis cernua*, **Ursinia anthemoides*, *Calandrinia granulifera*, *Calandrinia brevipedata*, **Petrohagia velutina*, **Hypochaeris glabra*, **Spergularia diandra*

Number of species: 29, 7 aliens.

(B) Western side: *Banksia menziesii* woodland

Stratum 1: Low trees to 5 m. *Banksia menziesii*, *Agonis flexuosa*

Stratum 2: Shrubs 3 m. *Hakea prostrata*, *Hardenbergia comptoniana* (vine)

Stratum 3: Shrubs 1 — 2 m. *Olearia axillaris*, *Calothamnus quadrifidus*, *Allocasuarina humilis*

Stratum 4: Shrubs 50 cm — 1 m. *Hemiandra pungens*, *Grevillea crithmifolia*, *Helichrysum cordatum*, *Scaevola canescens*, *Hibbertia racemosa*, *Acacia lasiocarpa*, *Acacia pulchella*, *Rhagodia baccata*, *Melaleuca acerosa*

Stratum 5: Herbaceous perennial. *Acanthocarpus preissii*, **Pelargonium capitatum*, *Kennedia prostrata*, *Tricoryne elatior*, *Loxocarya cinerea*, *Conostylis candidans*, **Ehrharta calycina* (20% cover), *Stipa flavescens*, *Lomandra maritima*, *Lepidosperma* sp., **Gladiolus caryophyllaceus*

Stratum 6: Herbs. **Lagurus ovatus*, *Crassula colorata*, **Ursinia anthemoides*, **Hypochaeris glabra*, **Anagallis arvensis*, **Petrohagia velutina*, **Medicago polymorpha*, **Cerastium glomeratum*

Number of species: 35, 9 aliens.

(C) *Eucalyptus decipiens* stand

Stratum 1: Mallee or low trees to 5 m. *Eucalyptus decipiens*, *Banksia attenuata*, *Banksia menziesii*, *Allocasuarina fraseriana*

Stratum 2: Shrubs 1 — 1.5 m. *Melaleuca acerosa*, *Calothamnus quadrifidus*, *Daviesia triflora*, *Allocasuarina humilis*, *Olearia axillaris*, *Stirlingia latifolia*, *Petrophile macrostachya*, *Acacia lasiocarpa*, *Hardenbergia comptoniana* (vine)

Stratum 3: Shrubs 20 — 40 cm. *Conostephium pendulum*, *Isotropis cuenifolia*, *Hybanthus calycinus*

Stratum 4: Herbaceous perennials. **Ehrharta calycina*, *Conostylis aculeata*, *Tetraria octandra*, *Prasophyllum elatum*, *Anigozanthos manglesii*, *Drosera pallida*, **Pelargonium capitatum*

Stratum 5: Herbs. *Crassula colorata*, **Ursinia anthemoides*, **Hypochaeris glabra*, **Cerastium glomeratum*, **Heliophila pusilla*, **Anagallis arvensis*, **Petrohagia velutina*

Number of species: 30, 8 aliens.

(7) Tuart Woodland

Stratum 1: Trees >15 m. *Eucalyptus gomphocephala*

Stratum 2: Trees to 5 m. *Eucalyptus marginata*, *Hardenbergia comptoniana* (vine)

Stratum 3: Shrubs to 2 m. *Macrozamia riedleii*

Stratum 4: Herbaceous Perennials/Sedges. *Lepidosperma gladiatum* (>40% cover), **Ehrharta calycina*, **Pelargonium capitatum*, *Anthropodium capillipes*

Number of species: 8, 2 aliens.

(8) Jarrah Woodland

(A) Mallee Jarrah

Stratum 1: Trees to 6 m. *Eucalyptus marginata*, *Banksia grandis*

Stratum 2: Trees to 4 m. *Banksia menziesii*

Stratum 3: Shrubs to 2 m. *Macrozamia riedleii*

Stratum 4: Shrubs 50 cm — 1.5 m. *Acacia pulchella*, *Hibbertia hypericoides*, *Stirlingia latifolia*, *Daviesia triflora*, *Pimelea rosea*, *Leucopogon parviflorus*, *Olearia axillaris*, *Gompholobium aristatum*, *Hardenbergia comptoniana* (vine)

Stratum 4: Herbaceous perennials/Sedges. **Ehrharta calycina*, *Sowerbaea laxiflora*, *Conostylis aculeata*, *Drosera macrantha*, *Loxocarya cinerea*, *Diuris longifolia*

Stratum 5: Herbs. **Trifolium campestre*, **Ursinia anthemoides*, **Spergularia diandra*, **Hypochaeris glabra*, **Lupinus angustifolius*

Number of species: 24, 6 aliens.

(B) Marri — Jarrah Woodland

Stratum 1: Trees, >10 m. *Eucalyptus calophylla* (90% cover), *Eucalyptus marginata*

Stratum 2: Shrubs or small trees, 5 — 7 m. *Jacksonia furcellata*, *Acacia saligna*

Stratum 3: Shrubs 1 — 4 m. *Xanthorrhoea preissii*, *Hardenbergia comptoniana*, *Macrozamia riedleii*, *Acacia pulchella*, *Pimelea rosea*

Stratum 4: Shrubs 40 — 60 cm. *Hibbertia hypericoides*

Stratum 5: Herbaceous perennials/Sedges. **Pelargonium capitatum*, *Arthropodium capillipes*, *Burchardia umbellata*, **Ehrharta calycinum*, *Caesia micrantha*, *Lepidosperma* sp., *Sowerbaea laxiflora*, *Conostylis aculeata*

Stratum 6: Herbs. **Vicia sativa*, **Trifolium campestre*, **Petrohagia velutina*

Number of species: 21, 5 aliens.

(9) *Acacia xanthina* shrubland.

This species forms a tall (2-4 m) often closed low shrubland on the eastern slopes of Reabold Hill. The stand appears relatively even aged (although younger plants are found in canopy gaps) probably resulting from a fire c. 20 years ago.

Stratum 1: Shrubs 2 — 4 m. *Acacia xanthina*

Stratum 2: Shrubs 1 — 3 m. *Melaleuca huegelii* (vines *Hardenbergia comptoniana*, *Clematis microphylla*)

Stratum 3: Shrubs 0.5 — 1.5 m. *Beyeria cinerea*, *Trymalium ledifolium*, *Melaleuca acerosa*, *Leucopogon australis*, *Templetonia retusa*, *Scaevola crassifolia*, *Hemiandra pungens*, *Olearia axillaris*, *Hibbertia spicata*, *Grevillea thelemanniana*, *Acacia lasiocarpa*, *Phyllanthus calycinus*

Stratum 4: Herbaceous — Perennial. *Lepidosperma* sp., *Caladenia latifolia*, *Prasophyllum elatum*, *Opecularia vaginata*, *Loxocarya cinerea*, *Thysanotus patersonii*, *Thysanotus sparteus*, *Wummba monantha*, *Dianella revoluta*, *Pterostylis robusta*, *Drosera* sp., **Romulea rosea*, *Eriochilus dilatatus*

Stratum 5: Herbaceous Annuals. **Hypochaeris glabra*, **Sonchus oleraceus*, **Galium aparine*, **Euphorbia peplus*, **Lagurus ovatus*, *Daucus glochidiatus*, *Helipterum cotula*, **Anagallis arvensis*, **Trifolium* sp. indet., **Erodium cicutarium*, **Centranthus macrosiphon*, *Trachymene pilosa*, *Trachymene caerulea*

Number of plant species: 42, 10 aliens.

A species-rich area with a diverse range of low shrubs, again most of the herbaceous layer has been replaced by alien species. In natural sandy openings moss swards are found with a different herb flora from the above and these are listed below:

**Hypochaeris glabra*, **Euphorbia peplus*, *Wummba monantha*, **Erodium cicutarium*, *Triglochin calcitrapa*, *Triglochin centrocarpa*, **Trifolium cernuum*, *Crassula colorata*, *Daucus glochidiatus*, **Cerastium glomeratum*, **Senecio vulgaris*, **Lagurus ovatus*, **Fumaria muralis*, *Trachymene pilosa*, *Thysanotus patersonii*, **Silene gallica*

(10) Swamp

An artificially dammed wetland (used as a watering point for camels). The deeper central portion of the lake is dominated by *Typha orientalis* and on the shallower margins by *Bulboschoenus caldwellii*, surrounding the lake are low woodlands and shrublands.

(A) Lake Quadrat; Southern Edge

Stratum 1: Rhizomatous herbs to 1 m. **Typha orientalis*, *Bulboschoenus caldwellii*

Stratum 2: Rhizomatous herbs to 20 cm. *Sporobolus virginicus*, **Phyla nodiflora*, *Triglochin striata*

Stratum 4: Herbs. **Aster subulatus*, **Atriplex prostrata*

(B) Southern Edges Woodland

Stratum 1: Trees >10 m, 5% cover. *Eucalyptus nudis*

Stratum 2: Trees to 7 m, 70% cover. *Acacia saligna*, *Hardenbergia comptoniana* (vine)

Stratum 3: Sedges/Grasses. **Stenotaphrum secundatum*, *Baumea juncea*, **Pennisetum clandestinum*, **Pelargonium capitatum*, *Lepidosperma* sp.

(C) Northern Edges

Stratum 1: Trees >10 m. *Eucalyptus nudis* (rare), *Melaleuca incana*, *Acacia saligna*

Stratum 2: Herbaceous perennials/Sedges. *Centella cordifolia*, **Cynodon dactylon*, *Lobelia alata*, *Juncus kraussii*, **Sonchus aff. asper* (GK 11001)

(11) Limestone Heath

(A) *Acacia truncata* dominated

Stratum 1: Shrubs 70 cm — 1.5 m. *Acacia truncata*, *Templetonia retusa*, *Trymalium ledifolium*, *Dryandra sessilis*

Stratum 2: Shrubs 30 — 60 cm. *Melaleuca acerosa*, *Olax benthamiana*, *Grevillea thelemanniana*, *Melaleuca acerosa*, *Diplopeltis huegelii*, *Astroloma microcalyx*, *Stylidium aff. affine*, *Opercularia vaginata*

Stratum 3: Herbaceous perennials/Sedges. **Pelargonium capitatum*, *Lepidosperma angustatum*, *Loxocarya cinerea*, *Stipa flavescens*

Stratum 4: Herbs. **Euphorbia peplus*, **Anagallis arvensis*, *Daucus glochidiatus*, **Sonchus oleraceus*, **Petrohagia velutina*, *Monotaxis grandiflora*, *Drosera macrantha*, *Calandrinia brevipedata*, **Galium aparine*

Number of species: 25, 6 aliens.

(B) *Eucalyptus foecunda* Mallee Shrubland

Stratum 1: Mallees 2 — 3 m (60% cover). *Eucalyptus foecunda*, *Olearia axillaris*, *Dryandra sessilis*, *Hardenbergia comptoniana* (vine), *Melaleuca acerosa*

Stratum 2: Shrubs to 1.5 m. *Allocasuarina humilis*, *Macrozamia riedleii*, *Olax benthamiana*

Stratum 3: Perennial Grasses/Sedges. **Ehrharta calycina*, *Conostylis aculeata*, *Loxocarya cinerea*, *Tetraria octandra*, *Acanthocarpus preissii*

Stratum 4: Herbs. **Ursinia anthemoides*, **Petrohagia velutina*, *Triglochin calcitrapa*, *Crassula colorata*, *Isolepis cernua*, **Spergularia diandra*, **Anagallis arvensis*, **Cerastium glomeratum*, **Heliophila pusilla*

Number of species: 22, 7 aliens.

APPENDIX 2 VASCULAR PLANTS OF BOLD PARK KEY: *INTRODUCED

Taxon	Vegetation Type						
	Swamp	Tuart	Jarrah	Banksia	Heath	Wattle	Limestone Disturbed Heath Area
ZAMIACEAE							
<i>Macrozamia riedlei</i> (Fisher ex Gaudich.)							
<i>C. Gardeneri</i>			x	x	x		
PINACEAE							
* <i>Pinus pinaster</i> Aiton			plantation				
* <i>Pinus radiata</i> D. Don			plantation				
TYPHACEAE							
* <i>Typha orientalis</i> <i>C. Presl.</i>	x						
JUNCAGINACEAE							
<i>Triglochin calcitrapa</i> Hook.				x	x	x	x
<i>Triglochin centrocarpa</i> Hook.						x	
<i>Triglochin striata</i> Ruiz.	x						
POACEAE							
<i>Agrostis avenacea</i> <i>J. Gmelin</i>							x
<i>Agrostis preissiana</i> (Nees) Vick.	x						
* <i>Aira cupaniana</i> Guss	x	x					
<i>Amphipogon turbinatus</i> R. Br.				x			

Taxon	Vegetation Type							
	Swamp	Tuart	Jarrah	Banksia	Heath	Wattle	Limestone Heath	Disturbed Area
* <i>Avena barbata</i> Link			x	x	x	x		x
* <i>Briza maxima</i> L.	x	x		x	x			
* <i>Briza minor</i> L.	x		x	x				
<i>Bromus arenarius</i> Labill.				x	x			
* <i>Bromus diandrus</i> Roth	x		x	x	x	x		
* <i>Cynodon dactylon</i> (L.) Pers.	x							x
* <i>Ehrharta calycina</i> Smith		x	x	x	rare			
* <i>Ehrharta longiflora</i> Smith	x		x	x		x		
* <i>Eragrostis curvula</i> (Schrader) Nees								x
* <i>Hordeum leporinum</i> Link	x		x					
* <i>Hyparrhena hirta</i> (L.) Stapf.			x					x
* <i>Lagurus ovatus</i> L.	x		x	x		x	x	
* <i>Lolium rigidum</i> Gaudin	x	x	x					
<i>Microlaena stipoides</i> (Labill.) R.Br.		x						
<i>Neurachne alopecuroides</i> R.Br.				x				
* <i>Pennisetum</i> <i>clanderstinum</i> Hochst. ex Chiov.	x							
* <i>Pennisetum villosum</i> R. Br. ex Fresen		x						x
* <i>Paspalum dilatatum</i> Poiret								x
* <i>Phalaris canariensis</i> L.	x							
<i>Poa porphyroclados</i> Nees			x				x	
* <i>Polypogon monspeliensis</i> (L.) Desf.	x							
<i>Sporobolus virginicus</i> (L.) Kunth	x							
<i>Stipa elegantissima</i> Labill.		x			x		x	
<i>Stipa flavescens</i> Labill.				x	x	x	x	
* <i>Stenotaphrum secundatum</i> (Walter) Kuntze								x
* <i>Vulpia myuros</i> (L.) Gmelin	x			x				
CYPERACEAE								
<i>Baumea juncea</i> (R.Br.) Palla	x							
<i>Bulboschoenus caldwellii</i> (Cook) Sojak	x							
<i>Carex preissii</i> Nees		x						
<i>Caustis dioica</i> R.Br.				x				
<i>Cyperus altemiflorus</i> R.Br.	x							
<i>Isolepis cernua</i> (Vahl.) Rets				x	x		x	
<i>Isolepis nodosa</i> (Rottb.) R.Br.	x		x	x	x			
<i>Lepidosperma angustatum</i> R.Br.			x	x		x		
<i>Lepidosperma gladiatum</i> Labill.		x		x	x			
<i>Lepidosperma longitudinale</i> Benth.				x				
<i>Lepidosperma scabrum</i> Nees			x	x				

Taxon	Vegetation Type						
	Swamp	Tuart	Jarrah	Banksia	Heath	Wattle	Limestone Disturbed Heath Area
<i>Lepidosperma</i> sp. (GK 9258)	x		x				
<i>Mesomelaena stygia</i> (R.Br.) Nees					x		
<i>Mesomelaena tetragona</i> (R.Br.) Benth.					x		
<i>Schoenus grandiflorus</i> (Nees) F. Muell.					x		
<i>Schoenus lanatus</i> Labill.						x	
<i>Tetraria octandra</i> (Nees) Kuck.		x	x	x	x		
RESTIONACEAE							
<i>Alexgeorgea nitens</i> (Nees) Johnson et Briggs			x				
<i>Loxocarya cinerea</i> R.Br.				x	x	x	
<i>Loxocarya fascicularis</i> (R.Br.) Benth.						x	x
CENTROLEPIDACEAE							
<i>Centrolepis drummondiana</i> (Nees) Walp.				x			
JUNCACEAE							
<i>Juncus bufonius</i> L.							x
<i>Juncus kraussii</i> Hochst.	x						
<i>Juncus pallidus</i> R.Br.	x						
COMMELINACEAE							
<i>Cartonema phylloides</i> F. Muell.				x			
ASPARAGACEAE							
* <i>Myrsiphyllum asparagoides</i> (L.) Willd.		x		x	x	x	x
DASYPOGONACEAE							
<i>Acanthocarpus preissii</i> Lehm.		x		x	x	x	x
<i>Lomandra maritima</i> Choo				x	x	x	x
<i>Lomandra preissii</i> (Endl.) Ewart			x				
<i>Lomandra purpurea</i> (Endl.) Ewart			x				
XANTHORRHOEACEAE							
<i>Xanthorrhoea preissii</i> Endl.			x				
PHORMIACEAE							
<i>Dianella divaricata</i> R.Br.		x	x	x	x	x	
ANTHERICACEAE							
<i>Arthropodium capillipes</i> Endl.	x	x	x	x			
<i>Caesia micrantha</i> Lindl.			x	x			
<i>Corynotheca micrantha</i> (Lindl.) MacBride		x	x	x	x		
<i>Sowerbaea laxiflora</i> Lindl.			x	x	x		
<i>Thysanotus patersonii</i> R.Br.				x	x	x	x
<i>Thysanotus sparteus</i> R.Br.			x	x	x		
<i>Tricoryne elatior</i> R.Br.		x	x	x	x	x	
ASPHODELACEAE							
* <i>Asphodelus fistulosus</i> L.		x	x				x
* <i>Trachyandra divaricata</i> (Jacq.) Kunth		x			x		x
COLCHICACEAE							
<i>Burchardia umbellata</i> R.Br.			x	x	x		
<i>Wurmbea monantha</i> (Endl.) T.D. MacFarlane					x	x	x
HAEMODORACEAE							
<i>Anigozanthos humilis</i> Lindl.				x			
<i>Anigozanthos manglesii</i> D. Don				x	x		

Taxon	Vegetation Type							
	Swamp	Tuart	Jarrah	Banksia	Heath	Wattle	Limestone Heath	Disturbed Area
<i>Conostylis aculeata</i> R.Br.		x	x	x	x			
<i>Conostylis candicans</i> Endl.				x	x	x	x	
<i>Haemodorum spicatum</i> R.Br.			x	x	x			
<i>Haemodorum panniculatum</i> Lindl.			x					
AMARYLLIDACEAE								
* <i>Crinum</i> sp. (<i>?powellii</i>)								x
* <i>Narcissus tazetta</i> L.								x
AGAVACEAE								
* <i>Agave americana</i> L.		x						x
IRIDACEAE								
* <i>Chasmanthe floribunda</i> (Salzb.)								x
* <i>Freesia leichtlinii</i> Klatt		x	x					x
* <i>Ferraria crispa</i> Burm.								x
* <i>Gladiolus caryophyllaceus</i> (Burm.f.) Poir.				x	x			
* <i>Gladiolus undulatus</i> L.			x					
* <i>Lapeirousia</i> sp. (GK 10080)								x
<i>Patersonia occidentalis</i> R.Br.			x	x				
* <i>Romulea flava</i> (Lam.) De Vos			x					
* <i>Romulea rosea</i> (L.) Ecklon			x			x	x	
* <i>Sparaxis bulbifera</i> (L.) Ker Gawler	x		x					x
* <i>Watsonia</i> sp.		x						
ORCHIDACEAE								
<i>Caladenia discoidea</i> Lindl.	x							
<i>Caladenia flava</i> R.Br.			x					
<i>Caladenia latifolia</i> R.Br.	x				x	x	x	
<i>Caladenia patersonii</i> R.Br.				x				
<i>Diuris longifolia</i> R.Br.			x					
<i>Eriochilus dilatatus</i> Lindl.			x			x		
<i>Microtis unifolia</i> (G. Forst.) Reich.	x							
* <i>Monadenia bracteata</i> (SW.) T. Durande et Schinz			x					
<i>Prasophyllum elatum</i> R.Br.				x	x	x		
<i>Pterostylis scaber</i> Lindl. var. <i>robusta</i>						x	x	
<i>Pterostylis nana</i> R.Br.					x			
<i>Pterostylis vittata</i> Lindl.		x		x				
CASUARINACEAE								
<i>Allocasuarina fraserana</i> (Miq.) L.A.S. Johnson			x					
<i>Allocasuarina humilis</i> (Otto et Dietr.) L.A.S. Johnson				x	x		x	
MORACEAE								
* <i>Ficus carica</i> L.			(persisting)	x				
URTICACEAE								
<i>Parietaria debilis</i> G. Forst.						x	x	
PROTEACEAE								
<i>Banksia attenuata</i> R.Br.			x	x				
<i>Banksia littoralis</i> R.Br.	x							

Taxon	Vegetation Type							
	Swamp	Tuart	Jarrah	Banksia	Heath	Wattle	Limestone Heath	Disturbed Area
<i>Banksia grandis</i> Willd.		x	x					
<i>Banksia menziesii</i> R.Br.				x				
<i>Banksia prionotes</i> Lindl.				x				
<i>Conospermum triplinervium</i> R.Br.				x				
<i>Dryandra nivea</i> (Labill.) R.Br.	x		x	x	x			
<i>Dryandra sessilis</i> (Knight) Domin.					x		x	
<i>Grevillea crithmifolia</i> R.Br.				x	x			
<i>Grevillea thelemanniana</i> Hueg. ex Endl.					x	x	x	
<i>Grevillea vestita</i> (Endl.) Meisn.				x				
<i>Hakea prostrata</i> R.Br.				x	x		x	
<i>Hakea nuscifolia</i> Labill.	x			x				
<i>Persoonia saccata</i> R.Br.			x	x				
<i>Petrophile linearis</i> R.Br.			x	x				
<i>Petrophile macrostachya</i> R.Br.				x	x			
<i>Petrophile sermoriae</i> R.Br.							x	
<i>Stirlingia latifolia</i> (R.Br.) Steudel			x	x	x			
SANTALACEAE								
<i>Exocarpos sparteus</i> R.Br.					x			
<i>Santalum acuminatum</i> (R.Br.) A.DC.					x			
OLACACEAE								
<i>Olax benthamiana</i> Miq.					x		x	
LORANTHACEAE								
<i>Amyema miquellii</i> (Lehm. ex Miq.) Tieg.								
								I only on Tuart
POLYGONACEAE								
* <i>Emex australis</i> Steinh.								x
* <i>Rumex conglomeratus</i> Murray	x							
* <i>Rumex acetosella</i> L.			x					
CHENOPODIACEAE								
* <i>Atriplex prostrata</i> M. Bouch. ex DC.	x							
<i>Rhagodia baccata</i> (Labill.) Moq. ssp. <i>baccata</i>			x	x	x		x	
AMARANTHACEAE								
<i>Ptilotus polystachyus</i> (Gaud.) F. Muell.			x	x				
<i>Ptilotus drummondii</i> (Moq.) F. Muell.			x					
GYROSTEMONACEAE								
<i>Gyrostemon ramulosus</i> Desf.				x				
<i>Tersonia cyathiflora</i> (Fenzl.) George				x	x		x	
AIZOACEAE								
<i>Carpobrotus virescens</i> (Haw.) Schwantes					x			
* <i>Carpobrotus edulis</i> (L.) L. Bolus		x	x	x				x
* <i>Galenia pubescens</i> (Ecklon et Zeyher) Druce	x							
* <i>Tetragonia decumbens</i> Miller		x						

Taxon	Vegetation Type							
	Swamp	Tuart	Jarrah	Banksia	Heath	Wattle	Limestone Heath	Disturbed Area
PORTULACACEAE								
<i>Calandrinia brevipedata</i> F. Muell.				x	x			
<i>Calandrinia corrigioloides</i> F. Muell.			x	x	x			
<i>Calandrinia liniflora</i> Fenzl.							x	
<i>Calandrinia granulifera</i> Benth.				x	x			
CARYOPHYLLACEAE								
* <i>Cerastium glomeratum</i> Thuill.				x	x			
* <i>Mimuartia hybrida</i> (Vill.) Schischkin					x			
* <i>Monechia erecta</i> (L.) P. Gaert. Meyer et Scherb.							x	
* <i>Petrohagia velutina</i> (Guss.) P. Ball et Hayw.	x		x				x	x
* <i>Silene gallica</i> L.				x			x	x
* <i>Sagina apetala</i> Ard.				x	x			
* <i>Stellaria media</i> (L.) Villars				x	x	x	x	x
RANUNCULACEAE								
<i>Clematis microphylla</i> DC.		x	x	x	x	x		
<i>Ranunculus colonorum</i> Endl.	x	x	x					
LAURACEAE								
<i>Cassytha flava</i> Nees.					x	x	x	
<i>Cassytha racemosa</i> Nees.			x	x				
FUMARIACEAE								
* <i>Fumaria capreolata</i> L.		x				x		x
<i>Fumaria muralis</i> Sonder ex Koch		x	x			x		
BRASSICACEAE								
* <i>Brassica tournefortii</i> Gouan						x	x	x
* <i>Cakile maritima</i> Scop.					x			
* <i>Diplotaxis muralis</i> (L.) DC.								x
* <i>Heliophila pusilla</i> Lf.	x			x	x		x	x
<i>Stenopetalum robustum</i> Endl.							x	
DROSERACEAE								
<i>Drosera erythrorhiza</i> Lindl.			x	x				
<i>Drosera glanduligera</i> Lehm.							x	
<i>Drosera macrantha</i> Endl.			x	x	x			
<i>Drosera sp. ?pallida</i> Lindl.						x		
<i>Drosera stolonifera</i> Endl.			x					
CRASSULACEAE								
<i>Crassula colorata</i> (Nees.) Ostenf.			x	x	x	x		
<i>Crassula decumbens</i> Thumb.								x
<i>Crassula exserta</i> (Reader) Ostenf.		x					x	
* <i>Crassula glomerata</i> P. Bergius				x	x			
<i>Crassula pedicellosa</i> (F. Muell.) Ostenf.				x	x	x		
MIMOSACEAE								
<i>Acacia cochlearis</i> (Labill.) Wendl.				x				
<i>Acacia cyclops</i> A. Cunn. ex Don				x	x		x	

Taxon	Vegetation Type							
	Swamp	Tuart	Jarrah	Banksia	Heath	Wattle	Limestone Heath	Disturbed Area
<i>Acacia huegelii</i> Benth.			x					
<i>Acacia lasiocarpa</i> Benth.								
<i>Acacia pulchella</i> R.Br.		x	x	x	x	x	x	
<i>Acacia rostellifera</i> Benth.				x	x			
<i>Acacia saligna</i> (Labill.) Wendl.	x	x	x	x			x	
<i>Acacia truncata</i> (Burm.f.) Hart ex Hoffsgg.								
<i>Acacia xanthina</i> Benth.						x	x	
<i>Acacia willdenowiana</i> H.L. Wendl.						x		
FABACEAE								
<i>Bossiaea eriocarpa</i> Benth.				x				
* <i>Cytissus proliferus</i> Lf.								x
<i>Daviesia divaricata</i> Benth.				x	x			
<i>Daviesia triflora</i> M.D. Crisp		x	x	x				
<i>Gompholobium tomentosum</i> Labill.			x	x	x			
<i>Hardenbergia comptoniana</i> (Andr.) Benth.		x	x	x	x	x		
<i>Hovea pungens</i> Benth.			x	x				
<i>Hovea trisperma</i> Benth.			x	x	x			
<i>Isotropis cuneifolia</i> (Smith) Benth. ex Jackson			x	x	x	x		
<i>Jacksonia densiflora</i> Benth.		x	x					
<i>Jacksonia sericea</i> Benth.				x	x			
<i>Jacksonia stembergiana</i> Huegel.		x	x	x	x			
<i>Kennedia prostrata</i> R.Br.		x	x	x	x		x	
* <i>Lupinus angustifolius</i> L.		x	x					x
* <i>Lupinus cosentinii</i> Guss.		x	x	x				x
* <i>Medicago polymorpha</i> L.	x	x						x
* <i>Melilotus indica</i> (L.) All.	x							
<i>Oxylobium reticulatum</i> Meisn.							x	
<i>Sphaerolobium linophyllum</i> (Huegel.) Benth.			x			x		
<i>Templetonia retusa</i> (Vent.) R.Br.					x	x	x	
* <i>Trifolium campestre</i> Schreber	x							x
* <i>Trifolium cernuum</i> Brot						x		
* <i>Trifolium glomeratum</i> L.				x				x
* <i>Trifolium subterraneum</i> L.								x
* <i>Vicia sativa</i> L. ssp <i>sativa</i>	x		x					x
* <i>Vicia sativa</i> ssp <i>nigra</i> (L.) Ehrh.	x	x	x	x				x
* <i>Vicia hirsuta</i> (L.) Ehrh.	x		x	x				
GERANIACEAE								
* <i>Erodium moschatum</i> (L.) L'Her.								x
* <i>Erodium cicutarium</i> (L.) L'Her.				x	x			
* <i>Geranium molle</i> L.	x						x	x
* <i>Pelargonium capitatum</i> (L.) L'Her.		x	x	x	x		x	x
OXALIDACEAE								
* <i>Oxalis pes-caprae</i> L.		x	x			x		x
<i>Oxalis perenans</i> Haw.		x						
POLYGALACEAE								
<i>Comesperma confertum</i> Labill.							x	
<i>Comesperma calymega</i> Labill.								

Taxon	Vegetation Type							
	Swamp	Tuart	Jarrah	Banksia	Heath	Wattle	Limestone Heath	Disturbed Area
<i>Comesperma integerrimum</i> Endl.		x						
EUPHORBIACEAE								
* <i>Euphorbia pephus</i> L.		x	x			x	x	x
* <i>Euphorbia terracina</i> L.					x			x
<i>Beyeria cinerea</i> (Muell. arg.) Baillon						x		
<i>Phyllanthus cabcynus</i> Labill.			x	x	x	x	x	
<i>Poranthera microphylla</i> Brongn.						x	x	
* <i>Ricinus communis</i> L.		x						
STACKHOUSIACEAE								
<i>Tripterococcus brunonis</i> Endl.				x				
SAPINDACEAE								
<i>Diplopeltis huegelii</i> Endl.				x	x	x	x	
<i>Dodonaea aptera</i> Miq.					x			
MALVACEAE								
* <i>Lavatera 3retica</i> L.								x
* <i>Malva parviflora</i> L.								x
STERCULIACEAE								
<i>Thomasia triphylla</i> (Labill.) Gray		x						
RHAMNACEAE								
<i>Crypandra 2arbutiflora</i> Fenzl.							x	
<i>Spyridium globulosum</i> (Labill.) Benth.					x	x	x	
<i>Trymalium ledifolium</i> Fenzl.						x	x	
DILLENIACEAE								
* <i>Hibbertia cueniformis</i> (Labill.) Smith		x						
<i>Hibbertia hypericoides</i> (DC.) Benth.		x	x	x				
<i>Hibbertia spicata</i> F. Muell. ssp.								
<i>leptotheca</i> J. Wheeler						x	x	
<i>Hibbertia racemosa</i> (Endl.) Gilg.				x				
(GK 10061 green form)				x				
<i>Hibbertia racemosa</i> (Endl.) Gilg. (GK 10063 glaucous form)				x	x		x	
CLUSIACEAE								
<i>Hypericum gramineum</i> G. Forster	x							
VIOLACEAE								
<i>Hybanthus calycinus</i> (DC. ex Ging.) F. Muell.			x	x	x			
THYMELAEACEAE								
<i>Pimelea calcicola</i> B.L. Bye							x	
<i>Pimelea rosea</i> R.Br.			x	x				
MYRTACEAE								
<i>Agonis flexuosa</i> (Sprengel) Schau.	x		x	x	x	x		
<i>Calothamnus quadrifidus</i> R.Br.			x	x	x		x	
<i>Chamelaucium uncinatum</i> Schau. in Lehm.					x			
<i>Eucalyptus calophylla</i> R.Br.		x	x					
<i>Eucalyptus decipiens</i> Endl.					x			

Taxon	Vegetation Type							
	Swamp	Tuart	Jarrah	Banksia	Heath	Wattle	Limestone Heath	Disturbed Area
<i>Eucalyptus foecunda</i> Schau.				x	x			
<i>Eucalyptus gomphocephala</i> DC.		x		x		x		
<i>Eucalyptus marginata</i> Donn ex Smith			x					
<i>Eucalyptus rudis</i> Endl.	x							
<i>Hypocalymma robustum</i> Endl.			x	x				
* <i>Leptospermum laevigatum</i> (Gaertner) F. Muell.				x				
<i>Melaleuca acerosa</i> Schau.				x	x	x	x	
<i>Melaleuca huegelii</i> Endl.						x	x	
<i>Melaleuca incana</i> R.Br.	x	x						
<i>Regelia ciliata</i> Schau.	x							
ONAGRACEAE								
* <i>Oenothera drummondii</i> Hook.								x
APIACEAE								
<i>Centella cordifolia</i> (Hook.) Nannf.	x							
<i>Daucus glochidiatus</i> (Labill.) Fisch., Meyer et Ave-hall.		x			x	x	x	
<i>Homalosciadium</i> <i>homalocarpum</i> (F. Muell.) Eichler			x	x	x			
<i>Hydrocotyle diantha</i> DC.				x				x
<i>Eryngium rostratum</i> Cav.		x	x					
<i>Trachymene coerulea</i> R.A. Graham						x	x	
<i>Trachymene pilosa</i> Smith			x	x	x	x	x	
<i>Xanthosia huegelii</i> (Benth.) Steudel			x	x	x			
EPACRIDACEAE								
<i>Acrotiche cordata</i> (Labill.) R.Br.							x	
<i>Astroloma ciliatum</i> (Lindl.) Druce			x					
<i>Astroloma microcalyx</i> Sond.							x	
<i>Astroloma pallidum</i> R.Br.			x					
<i>Conostephium pendulum</i> Benth.			x	x				
<i>Conostephium preissii</i> Sond.			x	x	x			
<i>Leucopogon australis</i> R.Br.			x					
<i>Leucopogon insularis</i> A. Cunn. ex DC.				x	x			
<i>Leucopogon propinquus</i> R.Br.			x					
<i>Leucopogon ?polymorphus</i> Sond.		x						
<i>Lysinema ciliatum</i> R.Br.			x	x				
PRIMULACEAE								
* <i>Anagallis arvensis</i> L. var. <i>arvensis</i>		x					x	x
* <i>Anagallis arvensis</i> L. var. <i>caerulea</i> Gouan		x		x	x	x	x	x
OLEACEAE								
* <i>Olea europea</i> L.		x						
LOGANIACEAE								
<i>Logania vaginalis</i> (Labill.) F. Muell.		x				x	x	

Taxon	Vegetation Type							
	Swamp	Tuart	Jarrah	Banksia	Heath	Wattle	Limestone Heath	Disturbed Area
GENTIANACEAE								
* <i>Centaurea erythraea</i> Rafn.						x	x	
VERBENACEAE								
* <i>Phyla nodiflora</i> (L.) E. Greene	x							
ASCLEPIDACEAE								
* <i>Gomphocarpus fruticosus</i> (L.) W.T. Aiton		x						
LAMIACEAE								
<i>Hemiandra pungens</i> R.Br. erect		x		x	x	x	x	
* <i>Stachys arvensis</i> (L.) L. prostrate				x	x	x		x
SOLANACEAE								
<i>Anthocercis littorea</i> Labill.					x	x		
* <i>Lycium ferocissimum</i> Miers		x						
* <i>Solanum nigrum</i> L.	x	x				x	x	
* <i>Solanum sodomaeum</i> L.		x						
<i>Solanum symonii</i> H. Eichler						x		
SCROPHULARIACEAE								
* <i>Bellardia trixago</i> (L.) All.						x		
* <i>Dischisma arenarium</i> E. Meyer et Scherb.				x	x			x
* <i>Parentucellia latifolia</i> (L.) Caruel								x
OROBANCHACEAE								
* <i>Orobanche minor</i> Smith	x	x	x	x	x	x	x	
MYOPORACEAE								
<i>Eremophila glabra</i> (R.Br.) Ostenf.		x			x			
<i>Myoporum insulare</i> R.Br.		x			x			
<i>Myoporum caprarioides</i> Benth.	x							
RUBIACEAE								
* <i>Galium aparine</i> L.				x		x	x	
<i>Opercularia vaginata</i> Labill.			x	x	x	x	x	
<i>Opercularia hispidula</i> Endl.	x							
VALERIANACEAE								
* <i>Centranthus macrosiphon</i> Boiss.						x		
CAMPANULACEAE								
* <i>Wahlenbergia capensis</i> (L.) A.DC.			x	x				
<i>Wahlenbergia preissii</i> Vriese				x	x			
LOBELIACEAE								
<i>Lobelia alata</i> Labill.	x							
<i>Lobelia gibbosa</i> Labill.					x			
<i>Lobelia tenuior</i> R.Br.			x	x				
GOODENIACEAE								
<i>Lechenaultia linarioides</i> DC.				x	x	x	x	
<i>Scaevola canescens</i> Benth.		x	x	x	x	x	x	
<i>Scaevola crassifolia</i> Labill.				R	x		x	
<i>Scaevola holosericea</i> Vriese				x	x			
<i>Scaevola thesioides</i> Benth.					x		x	
STYLIDIACEAE								
<i>Stylidium brunonianum</i>				x				

Taxon	Vegetation Type							
	Swamp	Tuart	Jarrah	Banksia	Heath	Wattle	Limestone Heath	Disturbed Area
Benth.								
<i>Stylidium junceum</i> R.Br.					x			
<i>Stylidium macrocarpum</i> (Benth.) R. Erickson				x	x	x		
<i>Stylidium repens</i> R.Br.				x				
<i>Stylidium</i> aff. <i>affine</i> (GK 9266)						x	x	
ASTERACEAE								
* <i>Arctotheca calendula</i> (L.) Levyns		x						x
* <i>Arctotis stoechadifolia</i> P. Bergius								x
* <i>Aster subulatus</i> Michaux	x							
<i>Asteridea pulverulenta</i> Lindl.			x	x				
<i>Brachycome iberidifolia</i> Benth.							x	
* <i>Carduus pycnocephalus</i> L.						x		
<i>Conyza bonariensis</i> L.								x
* <i>Conyza canadensis</i> (L.) Cronq.	x	x						x
* <i>Crepis foetida</i> L.						x	x	
* <i>Cotula turbinata</i> L.								x
* <i>Dittrichia graveolens</i> (L.) Greuter								x
<i>Gnaphalium sphaericum</i> Willd.						x	x	
<i>Helichrysum cordatum</i> DC.				x	x			
<i>Helipterum cotula</i> (Benth.) DC.						x	x	
* <i>Hypochaeris glabra</i> L.				x	x	x	x	
* <i>Lactuca saligna</i> L.	x							
* <i>Lactuca serriola</i> L.	x							
<i>Lagenifera huegelii</i> Benth.			x					
<i>Millotia myosotidifolia</i> (Benth.) Steetz.				x				
<i>Olearia axillaris</i> (DC.) F. Muell.				x	x			
<i>Olearia radis</i> (Benth.) F. Muell.							x	
* <i>Osteospermum clandestinum</i> (Lees.) Norlindh					x		x	x
<i>Podolepis lecanescens</i> Cunn. ex DC.			x					
<i>Podotheca angustifolia</i> (Labill.) Less					x	x	x	
<i>Senecio lautus</i> G. Forster ex Willd.			x		x		x	
* <i>Senecio vulgaris</i> L.					x	x		
* <i>Sonchus oleraceus</i> L.				x	x	x	x	x
* <i>Sonchus asper</i> Hill (GK 11001)	x							
* <i>Ursinia anthemoides</i> (L.) Poir.				x	x		x	x
* <i>Urospermum pictroides</i> (L.) Scop							x	
<i>Waitzia aurea</i> (Benth.) Steetz			x					
<i>Waitzia suaveolens</i> (Benth.) Druce					x	x		

APPENDIX 3
SPECIES PLANTED IN BOLD PARK

* = introduced species (note this includes non-native species)
+ = native Australian species not naturally occurring in Bold Park

- | | |
|--|--------------------------------------|
| + <i>Acacia microbotrya</i> | + <i>Grevillea tridentifera</i> |
| + <i>Acacia laneyra</i> | * <i>Genista alba</i> |
| * <i>Amaryllis belladonna</i> | + <i>Hakea bucculenta</i> |
| + <i>Anigozanthos x flavidus</i> | + <i>Hakea francisiana</i> |
| + <i>Banksia ashbyi</i> | + <i>Hakea multilineata</i> |
| + <i>Banksia baxteri</i> | + <i>Hakea lawrina</i> |
| + <i>Banksia burdettiana</i> | + <i>Hakea cucullata</i> |
| + <i>Banksia caleyi</i> | + <i>Hakea petiolaris</i> |
| + <i>Banksia hookeriana</i> | <i>Hibbertia cueniformis</i> |
| + <i>Banksia larinina</i> | (not the native population) |
| + <i>Banksia nutans</i> | + <i>Kunzea baxteri</i> |
| + <i>Banksia occidentalis</i> | + <i>Eremophila decipiens</i> |
| + <i>Banksia quercifolia</i> | + <i>Melaleuca cardiophylla</i> |
| <i>Banksia prionotes</i> | + <i>Melaleuca diosmifolia</i> |
| (not the native population) | + <i>Melaleuca lanceolata</i> |
| + <i>Banksia septimum</i> | + <i>Melaleuca quinquinervia</i> |
| + <i>Banksia sphaerocarpa</i> | + <i>Melaleuca raphiophylla</i> |
| + <i>Banksia speciosa</i> | + <i>Melaleuca violacea</i> |
| + <i>Banksia victoriae</i> | + <i>Melaleuca sp.</i> |
| + <i>Callistemon</i> cv. "Captain Cook" | * <i>Melia azederach</i> |
| + <i>Calothamnus</i> sp. | * <i>Myrsiphyllum declinatum</i> cv. |
| + <i>Casuarina obesa</i> | * <i>Nerium oleander</i> |
| <i>Chamaelaucium uncinatum</i> | * <i>Olea europea</i> |
| (several cultivars — not the | * <i>Washingtonia filifera</i> |
| native population) | * <i>Westringia dampieri</i> |
| + <i>Eucalyptus</i> aff. <i>foecunda</i> | |

VERTEBRATE FAUNA OF BOLD PARK, PERTH

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ABSTRACT

Bold Park, situated 11 km west of Perth and occupying coastal dunes, has the richest vertebrate fauna of any area in the metropolitan region. Sixty one birds, 29 reptiles, 3 frogs and 6 mammals (including 3 introduced species) have been recorded in the 300+ ha of bushland. Many additional bird species are associated with the adjacent wetlands of Perry Lakes. The endangered Black-lined Snake (*Vermicella calonotos*) and the Painted Button-quail, White-winged and Splendid Fairy-wrens are now very rarely seen in metropolitan areas. The significance of the Park as a conservation area for fauna is discussed.

INTRODUCTION

In the last decade there has been a remarkable upsurge in interest and commitment to the role of nature conservation in urban areas worldwide (Dickman & Doncaster 1987, Goode 1989 and references therein). Fundamental to this focus is the need for a thorough documentation of the natural resources in urban areas for both conservation and educational purposes (Feinsinger 1987). This paper documents the present day vertebrate fauna of one of the largest and least altered areas of natural bushland remaining in the Perth metropolitan area.

Bold Park occupies an area of over 300 ha and is situated close to the coast, 11 km west of Perth. The area is not only relatively large, but encompasses several landform and soil types and has a rich and diverse vegetation assemblage consisting of over 350 plant species Keighery *et al.* (1990). Maps in Keighery *et al.* indicate the location of Bold Park and the boundaries of the different vegetation associations.